

THE Duke of Devonshire will lay the foundation stone of the new technical institute and public library for Eastbourne on Saturday, April 25. The Duke has presented a site valued at 10,000l.

DR. ARTHUR DENDY has resigned the chair of biology in the Canterbury College (Christchurch, New Zealand), in order to go to the Cape of Good Hope as professor of zoology in the South African College, Cape Town, Cape Colony.

As an instance of the thorough manner in which educational problems are taken up in America, an announcement made by the Lahore correspondent of the *Pioneer Mail* is interesting. It appears that the University of Chicago has commissioned Mr. Alleyne Ireland to make a tour of the European dependencies in the East with a view to deliver a series of lectures on "Management of Tropical Colonies." He has already visited Hong Kong, Borneo, Singapore, and is now in India, though only as a tourist. He is devoting his attention for the present to European dependencies in Asia other than India.

At the last monthly meeting of the Pharmaceutical Society of Ireland, the following resolution was adopted:—That, in connection with the appointment of teachers of chemistry under the Department of Agriculture and Technical Instruction, the council take steps to ascertain the requirements of the Department, with the view of having their certificates accepted as qualifying their licentiates for the appointments. This resolution may lead to a modification of the course of instruction in the Irish Pharmaceutical Society's School of Chemistry which will make it possible for the licentiates of the school to qualify as teachers of chemistry in the Irish intermediate schools.

REFERENCE to the Education Bill for London was made in the King's speech delivered by His Majesty at the opening of the new Session of Parliament on Tuesday. The words used in the speech to the Commons were:—"Proposals will be submitted to you for completing the scheme of educational reform passed last Session by extending and adapting it to the metropolitan area." It is believed that the central authority for education in this area will be the County Council, but administrative details will be left in the hands of the borough councils to a greater extent than is the case with the local authorities under the extra-metropolitan Act of last year.

THE current number of the *Library* summarises, in a convenient tabular form, Mr. Carnegie's gifts to libraries and other educational institutions down to November 30 of last year. From these tables it is seen that England and Wales have benefited to the extent of 376,100l., this amount including a donation of 50,000l. to the University of Birmingham and one of 13,000l. to the Iron and Steel Institute. Ireland has received 100,600l. and Scotland 2,479,250l. The princely gift to Scotland includes the endowment fund of 2,000,000l. for Scottish universities, a sum of 100,000l. given to the Technical School at Galashiels, 38,000l. to the Dunfermline Technical School, and 50,000l. to Aberdeen University. Canada has received 954,000 dollars, which represents the total sum given for the foundation of thirty-one public libraries. Libraries and other educational institutions in the United States have reaped the advantage of Mr. Carnegie's munificence to the enormous extent of 212,882,173 dollars. The Fayette Upper University, Iowa, has received 225,000 dollars; the Louisville Polytechnic Institute 125,000 dollars; the Carnegie Laboratory of New York City 600,000 dollars; the Pennsylvania State College 100,000 dollars; the Carnegie Institute at Pittsburg 7,250,000 dollars; the Polytechnic School of the same place, as an endowment, two million dollars; and the National University of Washington ten million dollars. Cuba, too, has shared in the same lavish generosity, for Havana has received 250,000 dollars and Matanzas 2000 dollars.

## SOCIETIES AND ACADEMIES.

### LONDON.

Royal Society, January 22.—"Solar Eclipse of 1900 May 28. General Discussion of Spectroscopic Results." By J. Evershed, F.R.A.S.

The spectra discussed in this paper were obtained near the southern limit of total eclipse, and include, therefore,

the chromospheric spectrum of the south polar region of the sun, as well as the same spectrum in mid-latitudes.

The coincidence in position of the vast majority of the bright lines with the Fraunhofer dark lines is shown to be exact within the limits of the measures. But the relative intensities of the bright lines of any one element, although in general agreement with those of the corresponding dark lines, are not in all cases the same, and those lines which are exceptionally strong in the chromospheric spectrum are mostly lines which are enhanced in the spark spectrum of the element.

All the more prominent enhanced lines of iron and titanium as determined by Sir Norman Lockyer are found to coincide with strong lines in the chromosphere, and these lines are found to be equally prominent in the south polar region and in mid-latitudes.

The abnormal intensity of the enhanced spark lines in the flash spectrum is explained by assuming a continuous circulation of the solar gases in a radial direction, the highly heated ascending gases, emitting the enhanced lines, giving the predominant features to the chromospheric spectrum, whilst the cooler, more diffused gases, slowly subsiding, determine the character of the absorption spectrum.

The entire chromosphere is supposed to consist of innumerable small eruptions or jets, of a similar nature to the so-called metallic prominences, which latter are only the more pronounced manifestations of the same eruptive agencies.

Evidence for this is found in the characteristic features of the chromosphere, and in the structure of many of the Fraunhofer lines, which show emission lines underlying the narrow absorption lines. These ill-defined bright lines in the normal solar spectrum are displaced towards the violet, indicating a strong uprush of the hotter gases, whilst the narrow dark lines would appear to indicate a slow and uniform descent of the absorbing gases.

The final conclusion is that the spectrum of the chromosphere represents the emission of both ascending and descending gases, and the Fraunhofer spectrum represents the absorption of the descending gases only.

"Preliminary Note on the Relationships between Sun-spots and Terrestrial Magnetism." By Dr. C. Chree, F.R.S.

This deals with results of magnetic declination, inclination, horizontal and vertical force obtained at Kew Observatory (National Physical Laboratory) on magnetically quiet days from 1890 to 1900. The ranges of the diurnal inequalities are compared with the sun-spot frequencies as calculated by Wolfer. Between the diurnal range  $R$  of an element and the sun-spot frequency  $S$ , a linear relation  $R = a + bS$  . . . (1) is assumed,  $a$  and  $b$  being taken as constants for any given month of the year, but as fluctuating from one month to another. The values of  $a$  and  $b$  have been calculated for each month of the year from the eleven years' data by least squares. The preliminary note gives the mean values for "winter," "equinox" and "summer"—including four months in each season—and the mean for the twelve months. The constants  $a$ , representing the values of the range for zero sun-spot frequency, are smallest in winter and largest in summer. The constants  $b$  are in the case of the declination, inclination and horizontal force—where the sun-spot connection is more clearly marked than in the vertical force—largest at the equinox. The variation of  $b$  with the season appears closely the same for the three magnetic elements specified. On the average of the three, the proportional values obtained for  $b$  are, winter 82, equinox 115, summer 103. Whilst  $b$ , considered absolutely, appears largest at the equinoxes, the sun-spot influence (or rather correlation) is relatively much most important in winter. During the eleven years considered, Wolfer's mean sun-spot frequency was 41.7; so that, according to (1),  $1 + 41.7b/a$  represents the ratio of the range answering to mean sun-spot frequency to the range answering to absence of sun-spots. The average values of  $41.7b/a$  for the declination, inclination and horizontal force in winter, equinox and summer respectively were 0.57, 0.38 and 0.27. The means of the twelve-monthly absolute values found for  $b$  were, declination 0.041, inclination 0.013, horizontal force 0.19 and vertical force 0.03, where  $\gamma$  represents  $1 \times 10^{-5}$  C.G.S. Reference is made to work by Balfour Stewart, Ellis, Wolfer, Rajna and Angot, and the legitimacy of the use of Wolfer's table of sun-spot frequencies is considered.

January 29.—“On Skew Refraction through a Lens, and on the Hollow Pencil given by an Annulus of a very obliquely placed Lens.” By Prof. J. D. **Everett**, F.R.S.

The investigation here described was undertaken with the view of finding an explanation of the curious curves obtained by receiving on a screen, at certain distances, the hollow pencil which emerges from an annulus of a lens placed at a large obliquity (such as  $30^\circ$  or  $45^\circ$ ) to the incident beam.

The first requisite is a process for calculating the direction cosines of a ray after refraction at a given surface, when those of the incident ray and of the normal are given, along with the relative index of refraction; and the leading feature of the process here described is, *the preliminary calculation of the direction cosines of the tangent to the refracting surface in the plane of refraction*. The refracted ray (or unit length of it) is projected on this tangent and on the normal; and these two projections are themselves projected on the axes of coordinates, and added. This process differs *in toto* from that devised by Seidel and employed by Steinheil.

A simple case is chosen for testing the working of the process; the case of a narrow and thin annulus of a plano-convex lens, with a parallel pencil incident at  $45^\circ$  on its plane face, the index being 1.5, and the sine of the inclination of the normals to the axis 0.1. The direction-cosines are found for the emergent rays at twelve equidistant points; and from these, by harmonic reduction, expressions are deduced for the direction-cosines of any emergent ray. From the equations of the rays in terms of the direction-cosines and starting-points, numerous cross-sections are calculated and plotted.

Each ray intersects two others, and the aggregate of these points of intersection constitutes the two focal lines. The secondary line is found to be nearly straight, and inclined at about  $17^\circ$  to the original direction of the beam. The primary line is approximately a parabola, the chord joining its ends being about  $1\frac{1}{2}$  the distance of the chord from the vertex. The vertex is next the lens, and is the intersection of the two rays which lie in the principal plane. The rays which intersect at its ends have starting-points  $79^\circ$  distant from one of these rays, and  $101^\circ$  from the other.

Every cross-section shows a double point wherever it meets a focal line; and at the ends of the two focal lines these double points become cusps. The ends of the primary line have been located, and the rays which pass through them found as above, by means of the conditions for a stationary point, which must always hold at a cusp.

**Chemical Society**, February 5.—Dr. E. Divers, F.R.S., vice-president, in the chair.—The following papers were read:—The solubilities and transition points of lithium nitrate and its hydrates, by Dr. F. G. **Donnan** and Mr. B. C. **Burt**. Lithium nitrate was found to yield two hydrates,  $\text{LiNO}_3 \cdot 3\text{H}_2\text{O}$  and  $\text{LiNO}_3 \cdot \frac{1}{2}\text{H}_2\text{O}$ . Determinations of the solubility of these hydrates and of the anhydrous salt were made, and the various quadruple points thus located confirmed by thermometric and dilatometric measurements.—The synthesis of *aa*-diglutamic acid, by Drs. O. **Silberrad** and T. H. **Easterfield**.—Distillation of chlorine water, by Dr. A. **Richardson**. When chlorine water is distilled below  $100^\circ\text{C}$ . the distillate contains free chlorine; the residue left in the retort liberates iodine from potassium iodide, bleaches indigo solution immediately and gives the usual reactions obtained with hypochlorous acid. Distillation of chlorine water in a current of chlorine gas shows that the hydrochloric acid formed in the residue is equivalent to the hypochlorous acid found in the distillate, indicating that a portion of the chlorine reacts with the water thus,  $\text{Cl}_2 + \text{H}_2\text{O} = \text{HCl} + \text{HClO}$ . When chlorine water is heated in a flask provided with a reflux condenser no change in its composition occurs.—A new vapour density apparatus, by Mr. J. S. **Lumsden**. This apparatus is based on the principle that the molecular weights of all substances in the state of gas, when occupying the same volume at the same temperature, exert the same pressure. From the pressure produced by vaporising a weighed quantity of a substance the molecular weight of which is required, the weight in milligrams which would produce the milligram molecular pressure is

calculated and taken as the molecular weight.—A new form of pyrometer, by the same. A further application of the principle employed in the foregoing apparatus. A constant volume instrument, made of glass, porcelain or metal, is used, in which a weighed quantity of a substance is vaporised and the pressure measured by a mercury gauge. The pressures produced by equal weights of substances are proportional to the absolute temperatures; therefore, if at two temperatures the pressures produced by equal weights are measured and one temperature is known, the second is determinate.—Tertiary butyl phenol, by Mr. E. W. **Lewis**. The non-formation of phenyl-*ter*-butyl ether when phenol in alcoholic solution is digested with *ter*-butyl chloride and alkali affords an instance of the difficulty attending the preparation of phenyl ethers containing a tertiary radical in place of the hydrogen atom of the phenolic hydroxyl.

**Mathematical Society**, February 12.—Prof. H. Lamb, president, in the chair.—The following papers were communicated:—Lieut.-Colonel **Cunningham**, On 4ic residuarity and reciprocity. The criterion for distinguishing the plus and minus signs in the congruence denoted, after Dirichlet, by  $(q/p)_4 = \pm 1$ , is the object of investigation. Reductions of the criterion to convenient forms are given and the properties of the symbol  $(q/p)_4$  are developed. Tables are appended giving the quadratic partitions (when possible) of all primes less than 500.—Mr. E. T. **Dixon**, Note on a point in a recent paper by Prof. D. Hilbert. It is pointed out that in the non-Pythagorean geometries devised by Hilbert, Helmholtz's axiom of monodromy is not verified, inasmuch as it is possible, by rotation through four right angles, to bring the points of a line into positions which they do not occupy before the rotation. It is pointed out further that, in the same geometries, it is possible to pass from one point to another of a straight line without passing through all intermediate points and without leaving the line. The application of the name “geometry” to systems which admit such possibilities is criticised.—Mr. H. **Hilton**, Some properties of binodal quartics. Properties of bicircular quartics are deduced from those of sphericonics by stereographic projection, and properties of binodal quartics are then deduced by plane projection.—Prof. A. W. **Conway**, The field of force due to a moving electron. The electron is treated as a point singularity of the electromagnetic equations, and formulæ to express the field of force about the electron, when moving with any velocity, are obtained. The amount of radiation from the electron is calculated.—Prof. W. **Burnside**, An arithmetical theorem connected with the roots of unity, and its application to group characteristics.

**Royal Microscopical Society**, Annual Meeting, January 21.—The president, Dr. Hy. Woodward, F.R.S., in the chair.—A series of twenty-four photomicrographs in colour was exhibited by Mr. Albert **Norman**, who said the examples shown were an application of the Sanger Shepherd process to medical photomicrography. The examples shown comprised histological and pathological sections, malaria and tse-tse fly parasites, and various bacilli, including tetanus and typhoid showing the flagella.—The **President** delivered his annual address, its title being “Some Ideas on Life,” based on the development of life as shown by fossil organisms found in geological strata.

**Mineralogical Society**, February 3.—Prof. H. A. Miers, vice-president, in the chair.—Mr. L. **Fletcher** gave an account of the fall of a meteoric stone on August 22, 1902, at Caratash, Smyrna, and also contributed a note on the history of the mass of meteoric iron found in the neighbourhood of Caperr, Patagonia.—Mr. H. L. **Bowman** gave the results of determinations of the refractive indices of pyromorphite and vanadinite by means of artificially ground prisms having an angle of about  $30^\circ$ . For red light the refractive indices of pyromorphite were  $\omega = 2.139$ ,  $\epsilon = 2.124$ , and of vanadinite,  $\omega = 2.354$ ,  $\epsilon = 2.299$ .—Mr. T. V. **Barker** described quartz crystals of peculiar habit which were collected by Lieut. E. G. Spencer-Churchill near De Aar, South Africa. Two crystals were remarkable as exhibiting faces seldom observed on quartz, one face in the zone *mz* and another in the zone *rz*.



**Geological Society, January 21.**—Prof. Charles Lapworth, F.R.S., president, in the chair.—The figure of the earth, by Prof. W. J. Sollas, F.R.S. The almost precise correspondence of great terrestrial features with a circular form seems to be frequently overlooked. The Aleutian curve has its centre in latitude  $6^{\circ}$  N., longitude  $177^{\circ}$  W., that of the East Indies about  $15^{\circ}$  N. and  $118^{\circ}$  E., and round the latter centre are several concentric curves. The northern part of South America, the Alpine-Himalayan chain, the western shore of North America and a portion of Australia may be similarly reduced to geometric form. A great circle swept through the centres of the East Indian and Aleutian arcs runs symmetrically through the bordering seas of Asia as far as Alaska, borders the inland lakes of America, passes the Californian centre, extends through the middle of the Caribbean Sea, runs parallel with the coast of the Antarctic Continent, and returns to the East Indian centre without touching Australia. This course is in remarkable correspondence with the general trend of the great zone of Pacific weakness. If the pole of this circle in the Libyan Desert is placed towards an observer in a globe, the African Continent appears as a great dome surrounded by seas and separated from the Pacific by an irregular belt of land. A second great circle defined by Lake Baikal, and with its centre at "the morphological centre of Asia" of Suess, and passing through the East Indian centre, may be regarded as the direction-circle for the Eurasian folding. These two centres intersect at an angle of  $39^{\circ}$ , and, on bisecting this angle, a mean directive circle is found, with its pole near the sources of the White Nile,  $6^{\circ}$  north of the Equator. The axis of terrestrial symmetry through this pole passes through the middle of Africa and of the Pacific Ocean. The smallest circle which will circumscribe Africa has its centre near this pole, and within it the symmetry of the fractured African dome is observable. Outside this comes a belt of seas, and outside that again the Pacific belt of continents, the Antarctic, South America, North America, Asia and Australia. Mr. Jeans has concluded on mathematical grounds that the "pear-like shape of the earth" might have been possessed by it at the time of its consolidation; and he has suggested that Australia may represent the "stalked end" of the "pear." The author's observations would lead him to place it in Africa, and to regard the Pacific as covering the "broad end."—The sedimentary deposits of Southern Rhodesia, by A. J. C. Molyneux. The greater portion of the area of Southern Rhodesia lies on granite and gneiss, and on the schists and slates that contain the auriferous veins worked in ancient times, and now being again opened up on an extensive scale. The remaining area is on sandstone and other sedimentary beds, with coal-deposits and regions of volcanic rocks. To explain the deposition and order of these sediments several sections are given, one being along a line extending from the Zambesi River on the north, through Bulawayo and the central plateau, to the Limpopo River on the south, a distance of more than 400 miles. Another section, with remarks thereon, is copied, by permission, from a report by Mr. C. J. Alford on the coal-bearing rocks of the Mafungibusi District. Three appendices are added; one, on a new species of *Acrolepis* from the Sengwe Coalfield; a second, on some Lamellibranch Mollusca; and a third, on some fossil plants from Rhodesia.

**Zoological Society, February 3.**—Mr. Howard Saunders, vice-president, in the chair.—Dr. Walter Kidd read a paper describing the arrangement of hair on four mammals, the otter, domestic dog, ox and horse, considered as typical from the point of view of hair-slope. The rising complexity of these phenomena in the four forms was shown to be closely related to their differing habits and environments, and a division was made of adaptive and non-adaptive modifications of hair. It was maintained that the facts dealt with were closely connected with the problems of heredity.—A communication from Captain F. Wall, of the Indian Medical Service, contained an account of all the snakes hitherto recorded from China, Japan and the Loo Choo Islands, together with notes on those obtained by himself during the time he was attached to the China Expeditionary Forces in 1900-1902.—Mr. H. J. Elwes, F.R.S., read a paper on the variation of the elk, in which it was pointed out that from the author's personal experiences in Norway during six years' hunting he could entirely confirm the observations

of Dr. Lönnberg. Specimens showing variation in the antlers of the elk from Norway were exhibited.—Mr. R. Lydekker gave a description of the wild sheep of the Kopet Dagh, the range of mountains forming the northern boundary of Persia; this race had been named *Ovis arkal*, in 1857, by Blasius. Mr. Lydekker considered that this animal formed a recognisable subspecies of the Urial, and proposed to call it *Ovis vignei arkal*.—Staff-Surgeon P. W. Bassett-Smith, R.N., communicated a paper on three new parasitic Copepoda obtained by Mr. Cyril Crossland in East Africa.—A short paper was read by Colonel C. E. Stewart, C.S.I., in which he contended that the tiger was a recent intruder into the Peninsula of India. His reason for believing this was the absence of any Sanscrit word for tiger, and also the absence of any allusion to tigers among many of the older writers.—A communication was read from Prof. Sydney J. Hickson, F.R.S., containing a description of a new Hydrozoan obtained by Mr. Cyril Crossland in Zanzibar, for which the name *Ceratella minima* was proposed.—Dr. G. Herbert Fowler presented an eighth contribution to our knowledge of the Plankton of the Faeroe Channel, which dealt mainly with the Ostracoda, Copepoda, Amphipoda and Schizopoda captured during a cruise of H.M.S. *Research*, and their horizontal and vertical distribution. Short diagnoses by Dr. Wolfenden of three new species of Copepoda were given.

## PARIS.

**Academy of Sciences, February 9.**—M. Albert Gaudry in the chair.—On the gradual extinction of the motion at the back of an isolated wave, in an elastic medium having a resistance proportional either to the velocity or the displacement, by M. J. Boussinesq.—On the equations of motion and the supplementary relation in the midst of a vitreous medium, by M. P. Duhem.—Remarks by M. Alfred Picard on the first volume of his report on the Exhibition of 1900.—The President announced to the Academy the death of M. Lechartier, correspondent for the section of rural economy.—On entire functions of infinite order and differential equations, by M. Edm. Maillet.—On functional operations, by M. Hadamard.—On a theorem analogous to that of Bobillier, in the case of the rolling of a surface on an applicable surface, by M. G. Koenigs.—Temporary and permanent changes in nickel steels, by M. Ch. E. Guillaume. The permanent changes undergone by a bar of nickel steel have been observed over a period of six years, and amounted to about  $12 \mu$ . The amount of this change is too great for the alloy to be safely used for the construction of length standards of the first order, but serviceable secondary standards may be made, provided that comparisons with a primary standard are made at intervals.—On the variation of the mean velocity of the wind in the vertical, by M. Axel Egnell. The quantity of air displaced in the wind is constant at all heights from 300 metres to 12,000 metres. From this follows the very simple law that the mean velocity of the wind is in inverse proportion to the density of the air.—On a magnetic apparatus serving as a detector for electric waves, by M. G. Tissot.—On the disappearance of the radio-activity induced by radium on solid bodies, by MM. P. Curie and J. Danne. After a certain period the intensity of the radiation follows an exponential

law with the time, of the form  $I = I_0 e^{-\frac{t}{\theta}}$ . In general this law is independent of the nature of the radiating body, but for a few substances, of which celluloid is the best type, the activity decreases much more slowly, taking several days to fall to one-half.—On the displacement of the sulphuric acid of alkaline bisulphates by water, by M. Albert Colson. From a thermochemical study of the behaviour of solutions of sodium bisulphate the conclusion is drawn that this salt can react with water to give sulphuric acid and the neutral sulphate. An attempt will be made to utilise this reaction on the large scale.—On a new synthesis of orthodiazine, by M. R. Marquis. The diazine is obtained by the action of hydrazine hydrate upon maleic aldehyde. On the reduction of the diazine with sodium and alcohol, a small quantity of tetramethylene-diamine is produced, together with ammonia.—On the formation of azo-bodies. The reduction of ortho-nitrobenzyl alcohol, by M. P. Freundler.—The oxidation of the acetates of manganese and cobalt by chlorine, by M. H. Copaux. The acetates of cobalt and manganese

behave differently towards chlorine; in the first case a complicated chloroacetate of the oxide  $\text{Co}_2\text{O}_3$  is obtained, and in the second a manganese acetate derived from the sesquioxide.—Study of the action of selenyl chloride upon mannite, by MM. C. **Chabrie** and A. **Bouchonnet**.—The synthesis of anisic acid and paraethoxybenzoic acid, by M. F. **Boudroux**. Monobromo derivatives of phenols react readily with magnesium in the presence of anhydrous ether, and the magnesium compounds produced absorb carbon dioxide. The product of this reaction, treated with hydrochloric acid, gives the corresponding carboxylic acid. Acids have been obtained in this way from anisol and phenetol.—Studies in the pyrane series, by M. R. **Fosse**.—The migration of the methyl group under the action of hydriodic acid, by M. E. E. **Blaise**.—On a new orthocyclohexanediol and its derivatives, by M. **Léon Brunel**.—On two new glucotannoids, by M. **Eugène Gilson**.—On the essence of *Calamintha Nepeta* or *Marjolaine* in the south of France, by MM. P. **Genvresse** and E. **Chablay**. The essence contains pinene, pulegone and a new ketone, calaminthone, the properties of which, together with those of its oxime and semicarbazone, are described. Nascent hydrogen transforms this ketone into menthol.—Morphogenesis in *Salmacina Dysteri*, by M. A. **Malaquin**.—On the presence of glucose in the cephalorachidian fluid, by MM. L. **Grimbert** and V. **Coulaud**.—On the nutrition of *Sterigmatocystis nigra*, by M. **Henri Coupin**. Iron, silicon and zinc are not used for nutrition by *Sterigmatocystis nigra*, zinc even retarding the development. The mycelium is capable of furnishing the acidity necessary for the entire development.—On a disease of the branches of the fig, by M. A. **Prunet**.—On phthiriosis, a disease of the vine caused by *Dactylopius Vitis* and *Bornetina Corium*, by MM. L. **Mangin** and P. **Viala**. The disease is very prevalent in the vine in Palestine. The use of carbon bisulphide injected into the soil is recommended for combating the disease.—On a caoutchouc-bearing plant of the Lower Congo, by M. E. de **Wildeman**. The plant is a new species of *Clitandra*, resembling *C. orientalis*; it is named *C. Arnoldiana*.—On vegetative activity at the epoch of the Coal-measures, by M. B. **Ronault**. From a study of the fossils in coal, it is concluded that the cellular tissues possessed a greater activity of formation than at present, this activity being favoured by an appropriate vascular development.—On a special type of dunes on the borders of the Sahara, by M. B.-P.-G. **Hochreutiner**.—On the reduction of oligiste and magnetite by hydrocarbons, by M. L. de **Launay**.—An experimental contribution to the knowledge of life and muscular reactions, by MM. Ed. **Toulouse** and Cl. **Vurpas**.—On the lifting effect developed by the rotation of helices with vertical axes, by M. **Henri Villard**.

## DIARY OF SOCIETIES.

### THURSDAY, FEBRUARY 19.

ROYAL SOCIETY, at 4.30.—On the Formation of Definite Figures by the Deposition of Dust: Dr. W. J. Russell, F.R.S.—Mathematical Contributions to the Theory of Evolution. On Homotopy in Homologous but Differentiated Organs: Prof. Karl Pearson, F.R.S.—The Evaporation of Water in a Current of Air (Communicated by Prof. E. H. Griffiths, F.R.S.): Dr. E. P. Pernan.—On the Determination of Specific Heats, especially at Low Temperatures: H. E. Schmitz.

ROYAL INSTITUTION, at 5.—Arctic and Antarctic Exploration: Sir Clements Markham, K.C.B.

LINNEAN SOCIETY, at 8.—Electric Pulsation in *Desmodium gyrans*: Prof. J. C. Bose.—*Cerataphis Lataniae*, a remarkable Aphid: Alice L. Embleton.—Specialisation of Parasitism in the Erysiphaceæ: S. E. Salmon.

### FRIDAY, FEBRUARY 20.

GEOLOGICAL SOCIETY, at 3.—Annual General Meeting.

ROYAL INSTITUTION, at 9.—The Measurement of Energy: Principal E. H. Griffiths.

INSTITUTION OF MECHANICAL ENGINEERS, at 8.—Hydraulic Experiments on a Plunger Pump: Prof. John Goodman.—Experiments on the Efficiency of Centrifugal Pumps: Thomas E. Stanton.

### MONDAY, FEBRUARY 23

SOCIETY OF ARTS, at 8.—Paper Manufacture: Julius Hübner.

ROYAL GEOGRAPHICAL SOCIETY, at 8.30.—Further Explorations in the Canadian Rockies: Prof. Norman Collie, F.R.S.

INSTITUTE OF ACTUARIES, at 5.—Further Remarks on the Valuation of Endowment Assurances in Groups: George J. Lidstone.

### TUESDAY, FEBRUARY 24.

ROYAL INSTITUTION, at 5.—Recent Advances in Photographic Science: Sir William Abney, K.C.B.

ANTHROPOLOGICAL INSTITUTE, at 8.15.—Exhibition of Bronze Bells and other Objects from Nigeria: C. Partridge, jun.—Stone Implements from Perak: R. Swan.

SOCIETY FOR THE PROMOTION OF HELLENIC STUDIES, at 5.

INSTITUTION OF CIVIL ENGINEERS, at 8.—Mechanical Handling of Material: G. F. Zimmer.

### WEDNESDAY, FEBRUARY 25.

GEOLOGICAL SOCIETY, at 8.—On the Occurrence of Dictyozamites in England, with Remarks on European and Eastern Floras: A. C. Seward, F.R.S.—The Amounts of Nitrogen and Organic Carbon in some Clays and Marls: Dr. N. H. J. Miller.

SOCIETY OF ARTS, at 8.—Tonkin, Yunnan and Burma: F. W. Carey.

EPIDEMIOLOGICAL SOCIETY, at 8.30.—Discussion on the Panama Canal and the Introduction of Yellow Fever into Asia, to be opened by Dr. Patrick Manson, F.R.S.

UNIVERSITY COLLEGE CHEMICAL AND PHYSICAL SOCIETY, at 8.30.—The Attainment and Measurement of Low Temperatures: Dr. M. W. Travers.

### THURSDAY, FEBRUARY 26.

ROYAL SOCIETY, at 4.30.—Bakerian Lecture: Solid Solutions and Chemical Transformation in the Bronzes: C. T. Heycock, F.R.S., and F. H. Neville, F.R.S.

ROYAL INSTITUTION, at 5.—Insect Contrivances: Prof. L. C. Miall, F.R.S.

SOCIETY OF ARTS, at 4.30.—Gleanings from the Indian Census: J. A. Baines.

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—The Nernst Lamp: J. Stüttner.—And, if time permit, Distribution Losses in Electric Supply Systems: A. D. Constable and E. Fawcett.—A Study of the Phenomenon of Resonance in Electric Circuit by the Aid of Oscillograms: M. B. Field.

### FRIDAY, FEBRUARY 27.

ROYAL INSTITUTION, at 9.—Perfumes: Natural and Artificial: Dr. A. Liebmann.

INSTITUTION OF CIVIL ENGINEERS, at 8.—The Relative Advantages of Single Screws, Twin Screws, and Triple Screws, for Marine Propulsion: E. Falk.

### SATURDAY, FEBRUARY 28.

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